

METHOD FOR PRODUCTION OF HIGH PRESSURE STEAM FROM PRODUCED WATER

ABSTRACT

An evaporation based method for generation of high pressure steam from
5 produced water in the heavy oil production industry. De-oiled produced water is
processed through a high pH/high pressure evaporator driven by a commercial
watertube boiler. The vapor produced by the evaporator is suitable for the steam
assisted gravity drainage (SAGD) method being utilized by heavy oil recovery
installations, without the use of once through steam generators that require
10 extensive chemical treatment, and without requiring atmospheric distillation, which
requires high power consuming compressors. Evaporator blowdown may be
further treated in a crystallizing evaporator to provide a zero liquid discharge
(ZLD) system and, with most produced waters, at least 98% of the incoming
produced water stream can be recovered in the form of high pressure steam.